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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/446,471	03/24/2000	LI ZHANG	IOLL-281	2358

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MARK G LAPPIN
MCDERMOTT WILL & EMERY
28 STATE STREET
BOSTON, MA 02109-1775

EXAMINER

FORTUNA, ANA M

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 12/04/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/446,471

Applicant(s)
Zhang

Examiner
Ana Fortuna

Art Unit
1723



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Sep 17, 2001

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-23 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

19) ☐ Notice of Informal Patent Application (PTO-152)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

20) ☐ Other:

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DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

2. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
3. Claims 1, 3, 4, 12, 14, 15, 16, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanabe et al. (5,833,846) (Tanabe). Tanabe discloses a method as claimed including treatment of water containing ionic organic impurities with an apparatus including electrodeionization, ultraviolet radiation, e.g oxidizing agent, and chemically regenerated ion exchange apparatus, e.g. ion exchange polisher (Figure 1, elements (106, 108, 109, column 2, lines 23-68, column 3, lines 1-31).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 13, 5, 8, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanabe et al. (5,833,846)(Tanabe) as applied to claims 1, 3, 4, 12, 14, 15, 16, 18 above further in

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view of White (5,116,509). Tanabe fails to disclose the wave length of UV light applied in the oxidizing process or in the apparatus. It is conventional in the art to apply wave length of 184.9 nanometers in order to effect oxidation of organic in water and removal of TOC. White as to claim 2 discloses as conventional the treatment of water by combination of ultraviolet treatment at the wave length claimed and deionization and recirculating the water between the two steps a plurality of times (column 1, lines 1-62). White also discloses the substitution of deionization by electrodeionization, the combination of the electrodeionization treatment with other process, e.g. Reverse osmosis, ultrafiltration, ion exchange is also disclosed (column 2, lines 1-26, column, column 2, lines 59-68, column 3, column 4, lines 1-66). White also discloses the combination of the first apparatus and second apparatus as claimed in claim 2 in a second embodiment, e.g. electrodeionization-ion exchange, (column 3, lines 26-37).

6. Claims 1-4, 6, 7, 12-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawai et al (4,863,608) in view of Capiela et al.(4,676,908). Reference 608 discloses the process of treating and purifying water including reverse osmosis, ultraviolet light radiation and ion exchange, and further discloses the combination of ultraviolet light with catalyst for improving removal of carbon contaminants (column 1, lines 37-68, column 2, lines 1-11, column 3, lines 51-68). The combination with electrodialysis or electrodeionization is not disclosed. Reference '908 discloses reverse osmosis as equivalent to reverse osmosis for the purpose of removing carbonate or ionic species in water to be treated (column 5, lines 26-36, column 6, lines 37-42). It would have been obvious to one skilled in the art at the time the invention was made to alternatively

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select the combination of UV light treatment electro dialysis or reverse osmosis UV treatment for the removal of ionized carbon compounds, as suggested by '908 in a process of purifying water (column 8, lines 49-52).

7. Claims 1-6, 10, 12-19, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 61101292 and JP 53149873 or Copper et al (5,118,422) Reference '292 discloses the apparatus and process of removing organic substances from water, the process includes radiation, ion exchange, second radiation and second ion exchange, therefore, the combination of claim 2 having the first and second apparatus in the same apparatus is disclosed (abstract) Reference '873 discloses removing organic matter including UV treatment in presence of hydrogen peroxide, and further treatment with ion exchange after the reverse osmosis (abstract), it would have been obvious to one skilled in the art at the time the invention was made to substitute reverse osmosis by electro dialysis, since they are considered to be equivalent for removing organic matter, e.g. Carbon compounds or ionic matter from water. Reference '422 discloses the treatment of permeate from reverse osmosis membrane by ultraviolet radiation driven by and photocatalytic posttreatment (abstract), and further discloses the UV light of 185 nm, and the generation of hydrogen peroxide in the process is also disclosed (column 4, lines 51-63). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine conventional equivalents oxidation process either as pretreatment or posttreatment in a reverse osmosis or electro dialysis water treatment process, e.g. for elimination carbon components in

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ionic of ionized form and improve separation efficiency of the separation in the first and or second separation steps or apparatus unit.

8. **Response to Applicant Arguments:** in response to remarks about Tanabe et al.

Reference ('846), the process in the present invention is directed to removing organic carbon from water, decomposition the organic carbon in ionized and nonionized organic carbon by decomposition with UV treatment and pretreating or posttreating with electrodeionization between other, as in sep d) of claim 1, in claim 2 treating two times with the same apparatus is claimed, and in claim 3, selecting the first or second apparatus as an electrodeionization, etc., and the second apparatus can be a membrane, activated carbon, chemical regenerated ion exchange, activated carbon, etc (refining steps). Regarding to the source of water in '846, the water contains organic carbon, and the process is directed to removing both ionic and non ionic organic substances and removing TOC (column 7, last paragraph) unit 106 is disclosed as an electrodeionization (EDI), as claimed in the present invention, UV (108) is disclosed after EDI (106) treatment for decomposing the organic carbon in ionic and deionized carbon, and refining step or polisher (109) and (110) is a membrane separation selected form reverse osmosis (column 3, lines 7-31, column 3, lines 46-60, column 5, lines 49-65). Reference '846 further suggest using reverse osmosis and electrodeionization in any order in a process of treating water for removing TOC, and in combination with and organic carbon decomposition process or oxidation process,

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e.g. UV. For the reasons discussed above the rejection is maintained as discussed in the paragraphs above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana Fortuna whose telephone number is (703) 308-3857. The examiner can normally be reached on Monday-Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached on (703) 308-0457. The fax phone number for the organization

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where this application or proceeding is assigned is (703) 872-9310 for regular responses, and (703)872-9311 for after finals.



ANA FORTUNA
PRIMARY EXAMINER

Ana Fortuna

December 02, 2001